
Damper based on the magnetorheological elastomer for active vibration isolation of nanotechnological equipment

© V.P. Mikhailov, I.K. Zobov, A.S. Selivanenko

Bauman Moscow State Technical University, Moscow, 105005, Russia

An assessment of damping properties of the magnetorheological (MR) elastomers in conditions of influence on them a magnetic field is presented. Analysis of the semi-active vibration isolation system and the possibility of the adjusting visco-elastic properties of the damper are presented. Investigated the efficiency of absorption of energy of MR elastomers oscillations with the use of the obtained dependencies of mechanical hysteresis. The results of experimental research of the active MR-damper based on the MR elastomer are presented. The ability to adjust of the ratio and stiffness in semi-active mode of MR-damper is shown. Dependence of induction of the magnetic field in the working gap of MR-damper is presented. Use of the PID control, which allows to increase accuracy of positioning and smooth movement, reduce the time of the transition process, is shown.

Keywords: magnetorheological elastomers, active damping, hysteresis, viscosity, elasticity, precise vibration isolation systems.

Mikhailov V.P. (b. 1961) graduated from Bauman Moscow Higher Technical School in 1987. Dr. Sci. (Eng.), Professor of the Electronic Technologies in Mechanical Engineering Department of Bauman Moscow State Technical University. Author of 94 publications, specializes in the field of electronic machine building, vacuum technologies, nanoengineering, systems of micro- and nanopositioning and active vibration isolation. e-mail: mikhailov@bmstu.ru

Zobov I.K. (b. 1987) graduated from Bauman Moscow State Technical University in 2010. Post-graduate of the Electronic Technologies in Mechanical Engineering Department of Bauman Moscow State Technical University. Author of 12 publications, specializes in the field of electronic machine building, systems of micro- and nanopositioning and active vibration isolation. e-mail: java208@rambler.ru

Selivanenko A.S. (b. 1990) a student of the Electronic Technologies in Mechanical Engineering Department of Bauman Moscow State Technical University. Author of 5 publications, specializes in the field of electronic machine building, systems of micro- and nanopositioning and active vibration isolation. e-mail: selivanenko_a@mail.ru
